LESSON MAKER PRO

Graph Moves

Track points as a function changes.

HIGH SCHOOL · MT.PLUS.ALG.FUN.1

MT.PLUS.ALG.FUN.1 "Identify the effect on the graph of replacing f(x)f(x) by f(x) + k, k · f(x), f(k · x), and f(x + k) for specific values of k (both positive and negative)."

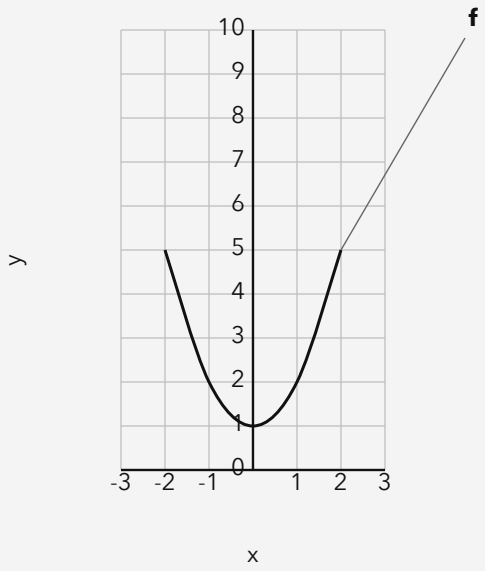
NAME _____ DATE _____

TRACK THE COORDINATES

In y = f(x) + k, add k to each y-coordinate. In y = k · f(x), multiply each y-coordinate by k. In y = f(k · x), divide each x-coordinate by k when k ≠ 0; in y = f(x + k), subtract k from each x-coordinate. A negative multiplier in either multiplication rule also reflects the graph across an axis.

WORKED EXAMPLE

The graph shows f. What is the minimum point of g(x) = f(x) + 7?

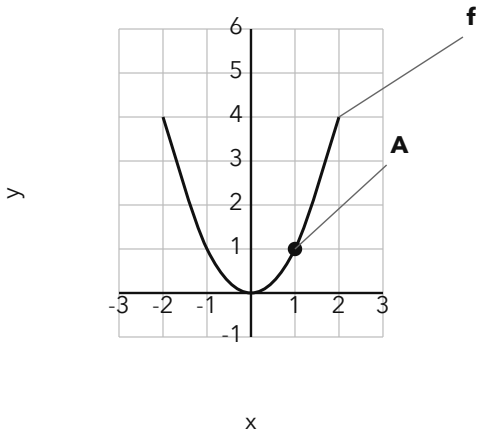


1. Find the minimum point of f: (0, 1).
2. Adding 7 to f(x) adds 7 to its y-coordinate.
3. The new point is (0, 1 + 7) = (0, 8).

Answer: (0, 8)

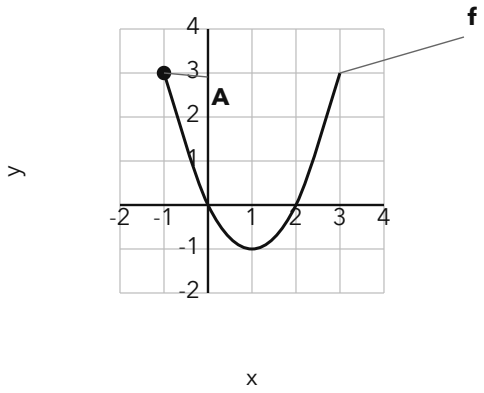
PRACTICE 6 problems

1 Point A is marked on f. Where does it land on g(x) = f(x) + 3?



ANSWER _____

2 Point A is marked on f. Where does it land on g(x) = -2 · f(x)?



ANSWER _____

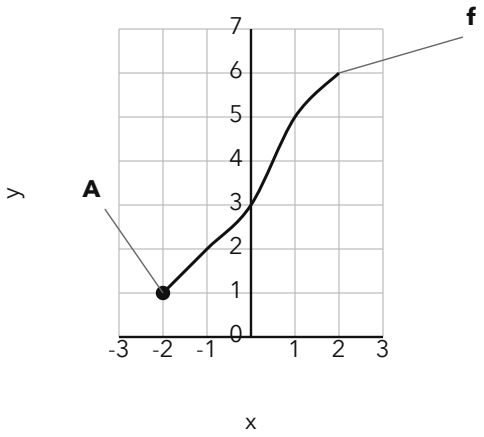
3 If f(2) = -4 and g(x) = 4 · f(x), what is g(2)?

ANSWER _____

4 If f(6) = -3 and g(x) = f(2 · x), what is g(3)?

ANSWER _____

5 Point A is marked on f. Where does it land on g(x) = f(-2 · x)?



ANSWER _____

6 The point (2, -1) lies on f. Where does it land on g(x) = f(x + 2)?

ANSWER _____

APPLY IT Show your work

1 A creator posts a video at noon. Its view count x hours after noon is f(x), and f(2) = 120. The creator posts the same video again 3 hours later. The later video's view count is g(x) = f(x - 3). How many hours after noon will the later video have 120 views?

WORK SPACE

ANSWER _____

2 In a game, f(x) is a player's net points after x rounds. A new rule changes every net score to -2 times its old value, so g(x) = -2 · f(x). If f(3) = -4, what is g(3)? Describe how the rule changes the graph.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The point (-6, 4) lies on y = f(x). Find its corresponding point on h(x) = -3 · f(-2 · (x + 1)). Explain how you found both coordinates.

WORK SPACE AND ANSWER

ANSWER KEY

Graph Moves

HIGH SCHOOL · MT.PLUS.ALG.FUN.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Point A is marked on f. Where does it land on g(x) = f(x) + 3?	**(1, 4)**
2	Point A is marked on f. Where does it land on g(x) = -2 · f(x)?	**(-1, -6)**
3	If f(2) = -4 and g(x) = 4 · f(x), what is g(2)?	**-16**
4	If f(6) = -3 and g(x) = f(2 · x), what is g(3)?	**-3**
5	Point A is marked on f. Where does it land on g(x) = f(-2 · x)?	**(1, 1)**
6	The point (2, -1) lies on f. Where does it land on g(x) = f(x + 2)?	**(0, -1)**

PART 2 · APPLY IT

1. **5 hours after noon** The later video's count at x = 5 is g(5) = f(5 - 3) = f(2) = 120.
2. **g(3) = 8. The graph reflects across the x-axis and stretches vertically by a factor of 2.** Compute -2 · (-4) = 8. Multiplying outputs by -2 reverses their signs and doubles their distances from the x-axis.

CHALLENGE

(2, -12). Set -2 · (x + 1) = -6 to get x = 2. Multiply the original y-coordinate by -3 to get -12.

Accept coordinates written as ordered pairs. For the game problem, accept equivalent descriptions of a vertical stretch and reflection across the x-axis.